Eric –

I never sent this letter which was originally dated May 24th. Sorry about any inconvenience!

Tom

YAKAMA NATION

40

RECEIVED

JUL 05 2011

DEPARTMENT OF ECOLOGY - CENTRAL REGIONAL OFFICE

July 1, 2011

Mr. Eric A. Hartwig
Washington Department of Ecology – Central Regional Office
15 West Yakima Ave -- Suite 200
Yakima, WA 98902-3452

RE: Water Rights Applications:

- G4-33005, Dryden ground water, 10/12/10
- S4-33010, Dryden surface water, 12/13/10
- G4-33006, George ground water, 10/29/10
- George surface water, submitted 2/24/11, not yet assigned a number

Dear Mr. Hartwig,

The Yakama Nation requests that the above applications be processed through the cost-reimbursement process, per RCW 90.03.265. As these applications meet the conditions for priority processing, it is understood that reimbursement will only include the cost for processing these applications.

GeoEngineers has done all the initial water supply evaluation work on these applications and we propose that they be selected for the Phase I reimbursement steps.

More detailed groundwater withdrawal impact analyses are currently being prepared and will be added to the applications this June.

Please confirm receipt of this request and return a sample Phase I analysis that meets WDOE requirements. The sample will help ensure that the analysis is complete.

Sincerely,

Tom Scribner

Tom Scribner
Yakama Nation

SEA SPRINGS CO.
Email: ghf@centurytel.net
Phone: (425) 765-0263

Washington Department of Ecology
PO BOX 47611
OLYMPIA, WA 98504-7611

12-3-10

RE: Dryden hatchery water rights applications

Please find enclosed:

1. George Hatchery Temporary Surface Water Rights application including:
   - Yakama Nation letter requesting priority processing
   - An analysis of the impact of the withdrawal
   - The $50 application fee
2. George Hatchery Permanent Surface Water Rights application including:
   - Yakama Nation letter requesting priority processing
   - An analysis of the impact of the withdrawal
   - The $50 application fee
3. George Hatchery Temporary Ground Water Rights application including:
   - Yakama Nation letter requesting priority processing
   - The $50 application fee

Please let me know if you have any questions.

Regards

G Ferguson

Greg Ferguson, PE
Sea Springs Co.

FISHERIES RESOURCE MANAGEMENT
7051 HWY 97 ■Peshastin, WA 98847■ 509 548-9413■ FAX: 509 548-2118
E-MAIL: cory@mid-columbia-coho.net

YAKAMA NATION

Odtober 14, 2010

Tom Tebb, Director
Washington Department of Ecology, Central Region
15 W. Yakima Ave, Suite 200

RE: Permanent Surface Water Right Application and Request for Priority Processing for the George Hatchery Site.

The Yakama Nation is proposing to incubate and rear coho salmon at a proposed hatchery on the Wenatchee River. The project purpose is to reintroduce coho salmon to the Wenatchee subbasin. Water use described in the enclosed water right application would support the reintroduction effort.

The Yakama Nation requests that this application be considered under conditions of priority processing as described in WAC 173-152-050(2)(b). The project meets the condition that it "would substantially enhance or protect the quality of the natural environment" and is non-cumptive.

Please let me know if you have any questions or need more information.

Sincerely

Cory Kamphaus
Yakama Nation

George Water Supply System Description and Impact Analysis

Prepared by: Greg Ferguson, Sea Springs Co.

February, 2011

Table of Contents

List of Figures

1. Introduction

The proposed design for the George Hatchery includes both ground and surface (Wenatchee River) supplies. Water requirements are shown in Figures 1-1 and 1-2 below. Groundwater would be used primarily for holding adults and incubating eggs. A small quantity would also be used to control icing at the proposed surface water intake.

Groundwater withdrawal from two proposed wells would be returned to the river at discharge location 2 (see Figure 1-3). It would not flow through the disconnected side channel.

Surface water withdrawal would be pumped from the river and delivered by pipeline to the hatchery. After passing through the hatchery, water would be discharged into the existing side channel (discharge location 1). Some of the water would enter the shallow groundwater aquifer and some would re-enter the Wenatchee 3,800 ft downstream of the withdrawal location.

Period	Ground *cfs*	Surface *cfs*	Total *cfs*
Aug	0.0	2.8	2.8
Sep	3.6	3.5	7.1
Oct	3.4	4.0	7.4
Nov	0.6	4.5	5.1
Dec	0.6	2.5	3.0
Jan	0.5	2.5	3.1
Feb	0.5	2.6	3.1
Mar	0.0	3.3	3.3
Apr	0.0	0.8	0.8
May	0.0	1.1	1.1
Jun	0.0	1.6	1.6
Jul	0.0	2.2	2.2

Figure 1-1. Design Water Flow Table

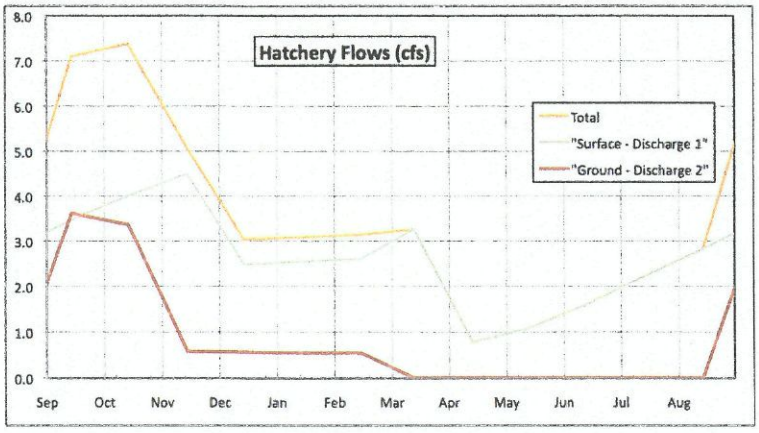


Figure 1-2. Design Water Flow Plot

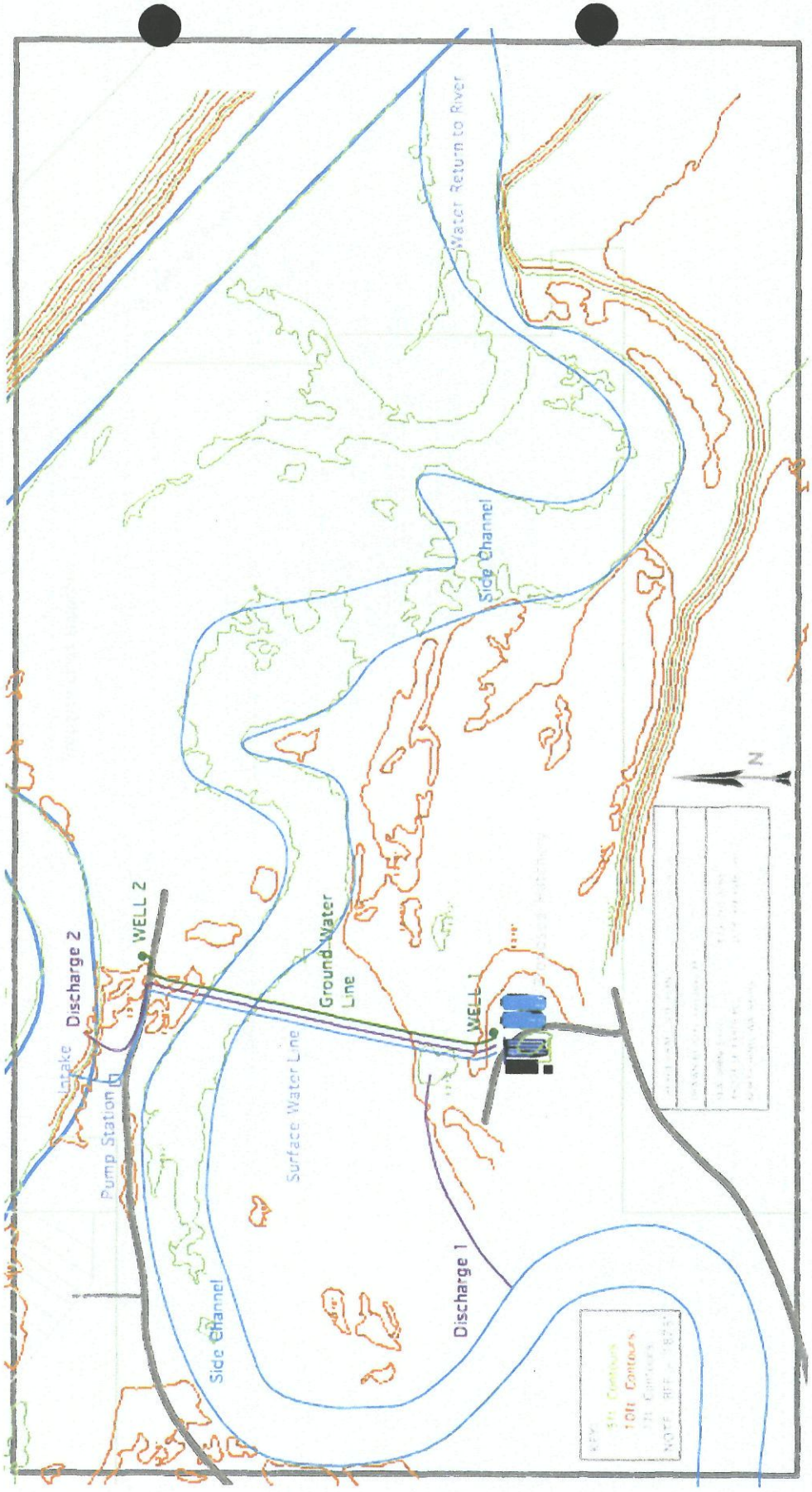


Figure 1-3. George Hatchery Site Plan

2. Withdrawal Impacts - General

The hatchery operation would be water-balance neutral; there is no net loss of water. However, potential consumptive impacts occur between the withdrawal and return locations and to a deep, confined aquifer.

Water is exchanged between the river and the aquifers underlying the site. Pumped groundwater is returned directly to the river after flowing through the hatchery and surface water infiltrates into the ground in the side channel.

During the river low flow period in early fall, the surface and ground water withdrawal amounts are roughly equal. The amount of surface water pumped from the river is replaced by groundwater discharged 100' downstream of the removal location. Surface water is returned to the side channel where some would enter the shallow aquifer (minus evaporation losses).

At other times of the year, more surface water than groundwater is used. Since some of that water would infiltrate into the ground within the side channel, there is a net loss to the river and a net gain to the aquifer. This may be a benefit to river conditions during low flow periods if some of this recharged groundwater contributes to river base flows.

The habitat benefits of adding water to the side channel have not yet been evaluated. The Yakama Nation is considering habitat projects for the property that include re-watering this side channel. Impact evaluations will be conducted as these plans are developed.

The overall impact to river flows of hatchery operations is positive or neutral during low flow conditions and as discussed in the sections below, is negligible during other times of the year.

3. Infiltration

Preliminary estimates have been made of the amount of infiltration to the groundwater aquifer that may occur as hatchery water passes through the side channel. GeoEngineers performed the estimate and used the following assumptions:

- Half of the 20 acre side channel is inundated.
- The average water depth will be 0.5 ft.
- The vertical infiltration rate is 0.26 ft/day (from the Washington Department of Ecology Stormwater Manual for loam soil).

- Groundwater mounding effects were not modeled.

Figure 3-1 below shows the results of the infiltration estimate applied to the amount of flow discharged from the hatchery into the side channel. Note that during April and May, it is estimated that all water will infiltrate to the aquifer.

Period	Hatchery Discharge *cfs*	% Infiltrated	Discharge to River *cfs*
Aug	**2.8**	50%	1.4
Sep	**3.5**	62%	2.2
Oct	**4.0**	67%	2.7
Nov	**4.5**	72%	3.2
Dec	**2.5**	50%	1.2
Jan	**2.5**	50%	1.2
Feb	**2.6**	51%	1.3
Mar	**3.3**	61%	2.0
Apr	**0.8**	100%	0.0
May	**1.1**	100%	0.0
Jun	**1.6**	13%	0.2
Jul	**2.2**	36%	0.8

Figure 3-1. Surface Water Discharge

Some field measurements were made that demonstrated higher infiltration rates than the applied value (0.26 ft/day value) used in the calculations. However, tests were not comprehensive enough to be used. More thorough field tests will be completed in the spring of 2011 and the infiltration estimates will be revised.

Water is lost to evaporation and is gained through precipitation in the side channel. GeoEngineers estimates that annual precipitation (1,017,000 cubic ft per year) is nearly the same as evaporation (1,051,000 cubic ft per year). These values are all much smaller than the annual hatchery flow to the side channel (82,529,000 cubic ft per year) and do not impact the evaluation analysis.

Recharge flow estimates, from the aquifer to the river, have not been made. It is expected that during river low flow conditions there would be an increased net movement of water from the shallow aquifer to the river. Infiltration of surface water in the side channel would contribute to Wenatchee River base flows.

4. Withdrawal Impacts – Groundwater

4.1. Well 2 Test Drilling Results

A test well was drilled in January, 2011 at well site 2. Pump tests have not yet

been performed on the completed well but a layer of material from 190 ft to bedrock at 214 ft was found which has good production potential. Details are provided in the following Memorandum from GeoEngineers:

GEOENGINEERS

Memorandum

1101 South Fawcett Avenue, Suite 200, Tacoma, WA 98402, Telephone: 253.383.4940, Fax: 253.383.4923 www.geoengineers.com

To:	Greg Ferguson, Sea Springs Company
From:	Joel W. Purdy, LG, LHG and James A. Miller, PE, LG, LHG
Date:	January 27, 2011
File:	9301-006-01
Subject:	Summary of Phase 1 Drilling for Well 2 at the George Property

INTRODUCTION

This memorandum summarizes the results of the Phase 1 drilling program for the first test well (Well 2) drilled at the George property. Well 2 is located approximately 150 feet from the south (right) bank of the Wenatchee River, downstream of Lake Wenatchee, near the proposed surface water intake for the hatchery. The drilling project has been separated into two phases. Phase 1 included drilling Well 2 to total depth. Phase 2, scheduled for later in 2011, will include design and placement of a well screen in Well 2, pumping tests in Well 2, and possibly drilling a second test well (Well 1) at the proposed hatchery site.

PHASE I SUMMARY

A GeoEngineers hydrogeologist was on site during the drilling of Well 2 from a depth of 18 feet to the total depth of 216.5 feet. The following is the summary of Phase 1 drilling based on our field notes:

- The air-rotary drilling rig was mobilized by Tumwater Drilling on January 11, 2011.
- Drilling began with the placement of the temporary 12-inch surface seal casing to a depth of 18 feet.
- On January 12, drilling continued below the surface seal casing with 8-inch diameter casing.
- The total depth of 216.5 feet was reached on January 13.
- The following is a brief description of the materials encountered during the drilling of Well 2:
  - 0 - 14 feet – Gray sandy gravel
  - 14 - 97 feet – Gray silt

- 97 - 165 feet – Gray silty fine to medium sand
- 165 - 167 feet – Light gray fine to coarse sand with occasional gravel
- 167 - 173 feet – Gray silty fine to medium sand
- 173 - 182 feet – Gray gravel with fine to coarse sand
- 182 - 190 feet – Gray silty fine sand (no samples)
- 190 - 210 feet – Gray medium to coarse sand with gravel and trace fine sand
- 210 - 214 feet – Gray medium to coarse sand with larger gravel
- 214 - 216.5 feet – Gray fine-grained sedimentary bedrock

- All formations were water-bearing below the base of the silt encountered from 14 to 97 feet.
- Sand and gravel heaved approximately 50 feet up inside the 8-inch casing when it was left overnight with the casing drilled to about 177 feet.
- Air-lift testing of the George Well 1 was conducted at 193, 200 and 205 feet. At each depth of these depths, we estimate that the well was producing roughly 150 gallons per minute through an open-bottom casing.
- The static water level in Well 1 was estimated to be approximately 14 feet based on observations during drilling. A true static water level could not be obtained because the casing was driven about 0.75 feet into the bedrock, shutting off the water entry to the well.
- The thick section of silt between the depths of 14 feet and 97 feet will function as an aquitard and separate the shallow water table aquifer from the deeper aquifer that overlies bedrock. The deep aquifer is expected to behave as a confined aquifer during aquifer testing.
- A surface seal has been placed from 0 to 18 feet using bentonite hole-plug chips and the well casing was capped.

RECOMMENDATIONS

We believe that the materials from 190 to 214 feet have good water production potential, with the best zones below about 199 feet where the materials are slightly coarser. The potential production rate for an 8-inch-diameter well is estimated to be 200 to 300 gpm or greater. Based on the results of Phase 1 drilling, we recommend that Well 2 be screened and tested. If approved, the following Phase 2 work will be completed:

1. GeoEngineers will conduct grain-size testing on Well 2 soil samples obtained between the depths of 184 and 214 feet.
2. We will design the slot size and length of a screen to be placed between 190 and 214 feet based on the results of the grain-size tests. The screen will likely be about 20 feet long.
3. We will provide the screen design to Tumwater Drilling, who will submit the screen order to a qualified screen manufacturer.
4. Tumwater Drilling will install and develop the screen in Well 2. We will be on-site during the screen placement and development.
5. Pumping tests will be completed on Well 2. Step-rate testing will be conducted first, followed by a constant-rate test of 4 to 12 hours, depending on the drawdown response in the well. Near the

conclusion of the constant-rate test, we recommend that water samples be obtained for chemical analyses.

6. We will provide a report that provides the results of the drilling and testing of Well 2.

Potentially, a second well (Well 1) will be drilled on the George property during Phase 2, depending on the results for Well 2.

JWP:JAM:tt

Pumping large quantities from the confined, deep aquifer could result in net depletion and a lowering of the water table. A static water level monitoring program would help monitor this potential impact.

4.2. Potential Impacts on Other Users

An evaluation of the impact of hatchery groundwater withdrawals on the aquifer and on surface flows was completed for the Mid-Columbia Coho Restoration Project (MCCRP) Draft Environmental Impact Statement (GeoEngineers, 2010). The following is quoted from that report:

"GROUNDWATER LEVELS

There is potential for localized impacts to groundwater levels due to groundwater withdrawals at the George site. Based on existing information on the source aquifer, the drawdown cone, defined by drawdown greater than 1 foot, would reach approximately 500 to 1,500 feet depending on aquifer characteristics and the degree of confinement of the source aquifer. There are no known wells within 1,500 feet of the proposed well sites."

A map of ground and surface water rights and claims (Figure 4-1) confirms that the closest claim, #6 on the map, is over 1,500 ft upstream of George Well 2. There is no depth information available for the claim but it is a domestic well that is likely shallow.

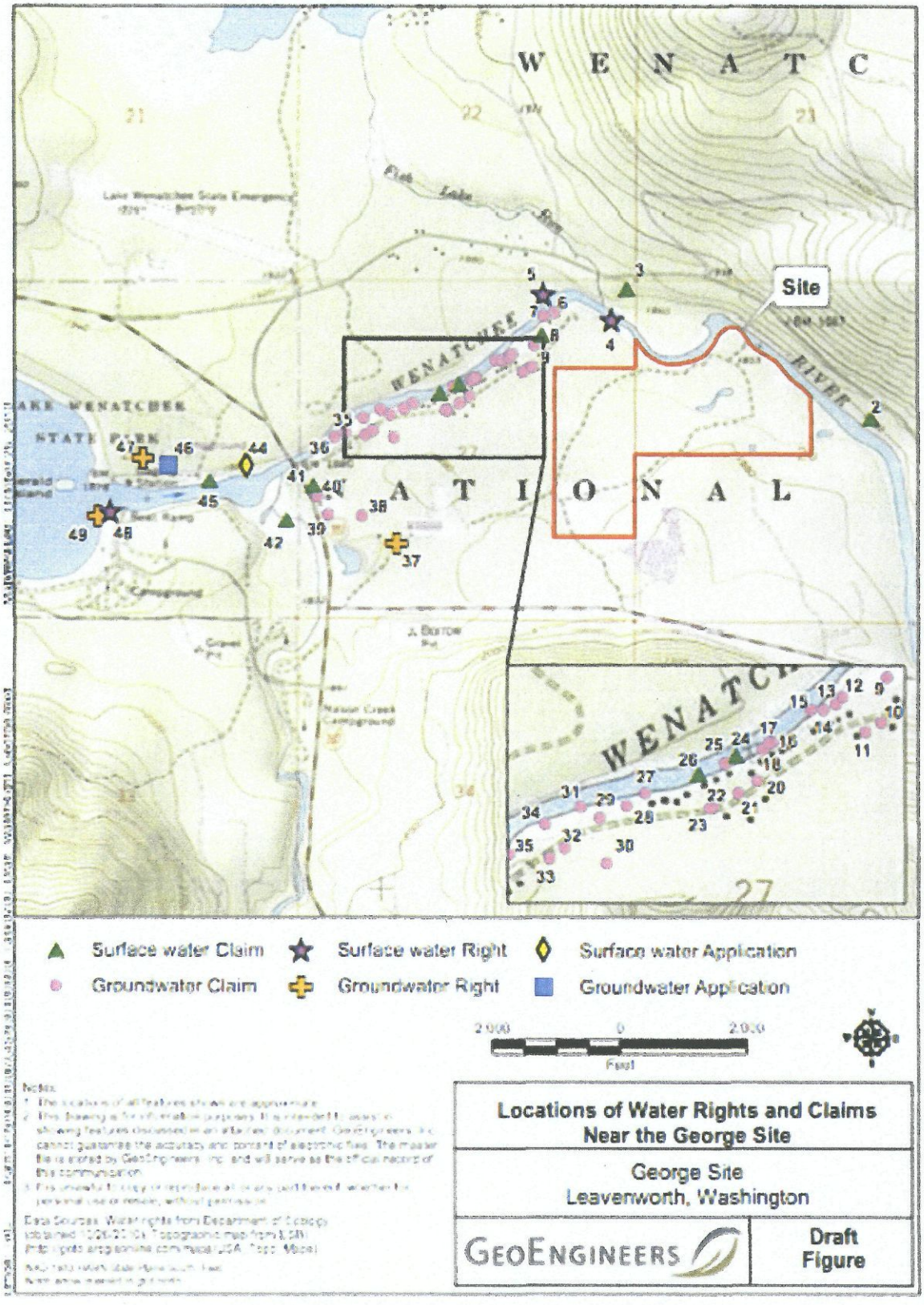


Figure 4-1. Water Rights Map

Map ID	Control #[1]	Owner	Qi (gpm)	Qi (cfs)	Qa (afy)	Acres	Purpose[2]
1	S4-025735CL	Washington DNR	--	0.01	1	--	ST
2	S4-025736CL	Washington DNR	--	0.01	1	--	ST
3	S4-033726CL	Harold Dunnagan	10	--	2	--	DG
4	S4-26882C	Harold Dunnagan	--	0.01	0.25	--	DS
5	S4-23169C	Washington DNR	--	0.5	6	--	DM, RE
6	G4-024455CL	Chelan County PUD No. 1	5	--	5	--	DG
7	G4-024455CL	Chelan County PUD No. 1	5	--	5	--	DG
8	S4-115912CL	Walter S. Glerup	10	--		--	NR
9	G4-024453CL	Chelan County PUD No. 1	5	--	5	--	DG
10	G4-024456CL	Chelan County PUD No. 1	5	--	5	--	DG
11	G4-001899CL	Cyril Smith	450	--	1.6	--	DG
12	G4-024452CL	Chelan County PUD No. 1	5	--	5	--	DG
13	G4-024451CL	Chelan County PUD No. 1	5	--	5	--	DG
14	G4-024450CL	Chelan County PUD No. 1	5	--	5	--	DG
15	G4-024448CL	Chelan County PUD No. 1	5	--	5	--	DG
16	G4-024449CL	Chelan County PUD No. 1	5	--	5	--	DG
17	G4-116449CL	Clarence Shea	--	--	--	--	DG
18	G4-083715CL	W.D. Kinsinger	--	--	--	--	DG
19	--	--	--	--	--	--	--
20	G4-024457CL	Chelan County PUD No. 1	5	--	5	--	DG
21	G4-024458CL	Chelan County PUD No. 1	5	--	5	--	DG
22	G4-155637CL	Austin Kimball	--	--	--	--	DG
23	G4-155638CL	Austin Kimball	--	--	--	--	DG
24	S4-147979CL	Harold Martret	10	--	2	--	DG
25	G4-085092CL	R. Wayne Hunter	--	--	--	--	DG
26	S4-077512CL	Harold Magnuson	--	--	--	--	DG
27	G4-024450CL	Chelan County PUD No. 1	5	--	5	--	DG
28	G4-024446CL	Chelan County PUD No. 1	5	--	5	--	DG
29	G4-059785CL	James Price	--	--	--	--	DG
30	G4-040526CL	Ruth Kriewald	--	--	--	--	DG
31	G4-072997CL	Leota Case	--	--	--	--	DG
32	G4-155639CL	Austin Kimball	--	--	--	--	DG
33	G4-138747CL	Edward Pekola	--	--	--	--	DG
34	G4-078426CL	Fred Ernst	--	--	--	--	DG
35	G4-151298CL	Joseph Weber	--	--	--	--	DG
36	G4-081084CL	Gustav Olson	--	--	--	--	DG
37	G4-30851C	Chelan County PUD No. 1	10	--	1	--	DG
38	G4-092314CL	Eugene Ertsgaard	--	--	--	--	DG
39	G4-082883CL	Westley Kriewald	--	--	--	--	DG
40	G4-086598CL	Elgin Kriewald	--	--	--	--	DG
41	S4-122355CL	F. Gilbert Lieser	--	--	--	--	DG
42	S4-067102CL	Washington DNR	--	0.01	1	--	ST
Map	**Control #[1]**	**Owner**	**Qi**	**Qi**	**Qa**	**Acres**	**Purpose[2]**
43	--	--	--	--	--	--	--
44a	S4-35272A	Chelan County PUD No. 1	--	0.01	0.24	--	FS
44b	S4-	Chelan County PUD No. 1	--	0.01	0.5	--	FS
45	S4-067101CL	Washington DNR	--	0.01	1	--	ST
46a	G4-35182A	Mark Peterson/Alpine Water District	--	0.99	500	--	MU
46b	G3-*22138C	Washington Parks	100	--	--	--	DM
46c	CS4-	Kahler Glenn Comm. Assn./Brown Road Water	--	0.12	11	--	MU
47a	CS4-SWC1390	USFS Okanogan	--	0.2	142.81	--	MU
47b	CS4-	USFS Okanogan	--	0.012	8.57	--	MU
48	S4-*19974C	Washington DNR	--	0.13	32	--	DM
49	G4-*08388C	Washington DNR	40	--	32	--	DM

[1] Control Number key-- Beginning codes: C = Change, S = Surface Water; G = Ground Water; Ending codes: CL = Claim, A = Application, P = Permit, C = Certificate

[2] Purposes: ST = Stock Watering, DG = Domestic General, DS = Domestic Single, DM = Domestic Multiple, RE = Recreation and Beautification, NR = ? (most likely a typo for IR), FS = Fish Propagation, MU = Municipal

Figure 4-2. Water Rights Map Key

The nearest groundwater certificate G4-30851C (#37 on the water right map) is controlled by Chelan County PUD No. 1 and is 1 mile from George wells 1 and 2. The well log indicates it was drilled to 124 feet in 1992.

It is unlikely that the George wells will impact other water claims or rights due to the distances that they are from the site and because the George wells would be withdrawing from a deeper aquifer.

4.3. Potential Impacts on Surface Water

The hatchery groundwater withdrawal impact report (GeoEngineers, 2010) also stated:

"SURFACE WATER FLOWS

There is potential for localized impacts to streamflows from groundwater withdrawals due to the potential that the source aquifer is in hydraulic continuity with surface water (Wenatchee River). A change in groundwater levels would result in a reduction in streamflow, the magnitude of which is dependent upon the degree of hydraulic continuity between aquifer and surface water. This minor reduction in streamflow will be completely offset and balanced by return flows from the hatchery.

Because of the water-balance neutrality of the proposed withdrawal of groundwater from an aquifer in hydraulic continuity with the stream and discharge of the groundwater back into the stream, there will be no regional impacts to streamflow within the Wenatchee River basin."

Subsequent to this report, the George test Well 2 was constructed and productive materials were found in a deep aquifer. The thick layer of silt above this productive layer limits the impact of groundwater withdrawal on river flows.

5. Withdrawal Impacts – Surface Water

The impact of hatchery surface water withdrawals was also studied for the MCCRP Environmental Impact Statement (Cramer Fish Sciences, 2010). The study concluded that a 4.7 cfs withdrawal had negligible effect on ESA listed fish habitat. The report states:

"The Wenatchee River provides spawning and/or rearing habitat for ESA listed spring Chinook salmon, steelhead, and bull trout (Appendix 9 of the EIS). We

evaluated potential impacts of hatchery surface water withdrawals on microhabitat availability for ESA listed fish using the PHABSIM methodology. This approach was chosen to enable direct comparison to flow effects quantified for the George hatchery site.

Wenatchee River mean discharge below Lake Wenatchee ranges between 200 cfs and 8,000 cfs annually (Figure 14). A total of 8 [now 7.4 cfs] cfs of water would be supplied to the George hatchery via ground and surface water sources. Surface water, approximately 4.7 [now 4.5 cfs] cfs, would be withdrawn from the Wenatchee River and piped to the hatchery. Hatchery discharge would be returned to the river 3,800 feet downstream of the withdrawal via a historic side channel that maintains hyporheic (subsurface) connectivity to the main stem. Discharged hatchery water would travel 5,600 feet before reaching the main stem, and some water would likely be lost to the ground depending on the river's flow stage. For simplicity, we assumed that returned flows would be equivalent to the amount of surface flow withdrawn; thus, our study reach was defined by the upstream withdrawal and downstream discharge locations (Figure 15).

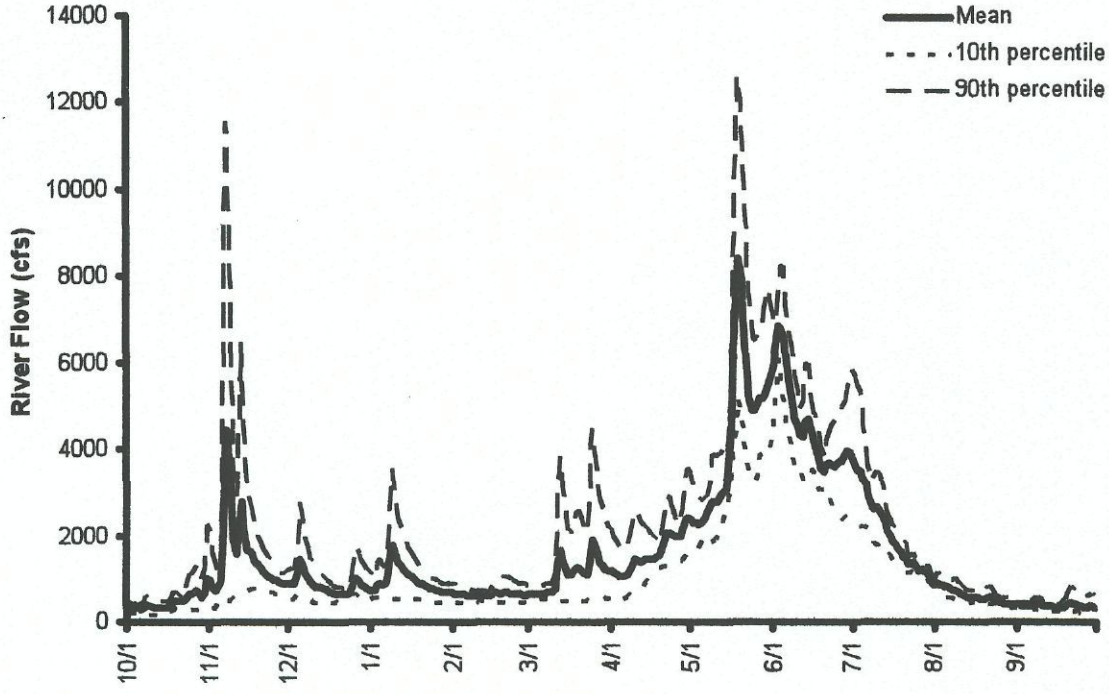


Figure 14. Wenatchee River discharge below Lake Wenatchee, water years 2005-2010. Washington Department of Ecology stream gage 45A240.

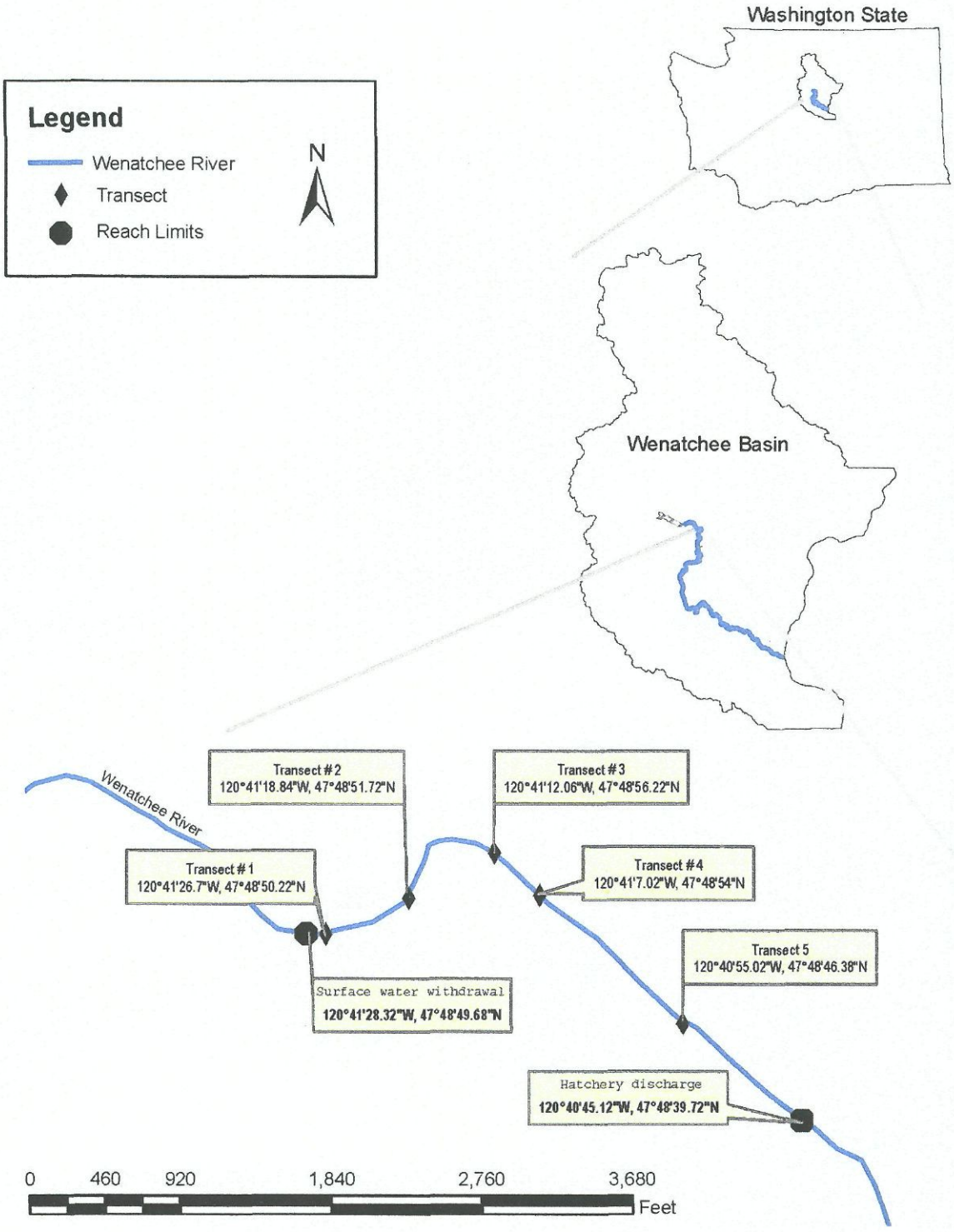


Figure 15. Map of the study reach adjacent to the George hatchery site. The reach was defined by the locations of surface water withdrawal and discharge. Locations of data collection transects are provided for reference.

The majority of the study reach was comprised of glide habitat (~60%), followed by pool (~30%) and riffle (~10%) habitat types. Stream substrate in pools was

composed of equal proportions of fines, gravel, and cobble with a small amount of boulder. Riffles had primarily gravel and cobble substrate. Glides were composed of near equal parts of fines, gravel and cobble. In-stream wood complexity was judged to be fair throughout the reach, and a total of 69 pieces of large wood were counted. Following completion of the stream habitat survey, five transects were selected in locations representative of the observed habitat composition within the study reach (Figure 15). Channel profile and water velocity data were collected at each transect in October 2010 and used to define the hydraulic characteristics of the study reach at base flows.

Field data was used to parameterize the IFG4 hydraulic model following the "one-velocity" method described by Milhous (1984). Habitat Suitability Criteria recommended by the State of Washington (WDFW and WDOE 2004) for steelhead, spring Chinook salmon and bull trout were coupled with IFG4 program output to simulate relative changes in microhabitat availability across a range of flows. Figure 16 provides PHABSIM results across the range of flows simulated. Note that simulations were not completed for flows above 450 cfs and, therefore, our analysis was limited to low flow periods. The effect of flow withdrawals on WUA was expected to be greatest during the low flow season. Results of comparisons between the no-withdrawal and 4.7 cfs withdrawal scenarios are presented in Table 7. We caution readers not to overuse the absolute values presented in Table 7 because the difference in flow between the two scenarios is small and PHABSIM analyses are most useful for evaluating a broad range of flows. Specific values are provided in Table 7 to demonstrate that the relative change in weighted useable area (WUA) was extremely small (less than 1.5%) for all species and life-stages. Thus, a 4.7 cfs flow change during low and extreme low flows in the Wenatchee River had negligible effects on WUA simulated for spring Chinook, steelhead and bull trout.

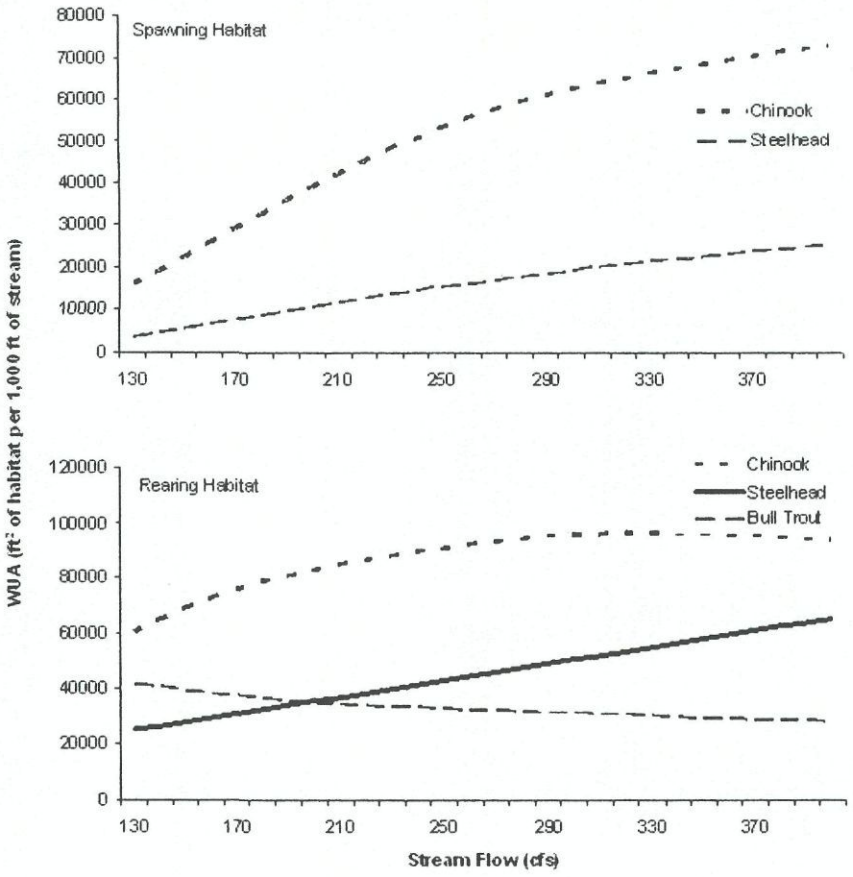


Figure 16. Estimated weighted useable area for spawning and rearing habitat as a function of fall stream flow in the Wenatchee River study reach.

Table 7. Estimated percent of weighted usable area for ESA listed species in the Wenatchee River study reach under low flow and extreme low flow conditions. Low flows for the study reach were calculated from available WDOE stream gauge data. Values are provided for current conditions and conditions expected if flows are reduced by 4.7 cfs.

Species	Lifestage	Timing	Flow type	Flow (cfs)	% of WUA	- 4.7cfs % of WUA
Chinook	Spawning	Aug-Sep	Extreme low	136	13.2%	12.1%
			Mean low	263	37.5%	36.7%
	Rearing	All year	Extreme low	136	44.8%	43.4%
			Mean low	263	62.4%	62.0%
Steelhead	Spawning	Mar-May	Extreme low	136	3.2%	2.9%
			Mean low	263	11.0%	10.7%
	Rearing	All year	Extreme low	136	18.5%	18.0%
			Mean low	263	30.1%	29.6%
Bull trout	Rearing	All year	Extreme low	136	28.2%	28.6%
			Mean low	263	22.1%	22.2%

6. Acronyms

Abbreviation	Definition
cfs	cubic feet per second
EIS	Environmental Impact Statement
MCCRP	Mid-Columbia Coho Restoration Project
PHABSIM	Physical Habitat Simulation System
Q	Flow
WUA	Weighted Usable Area
WDOE	Washington Department of Ecology
WDFW	Washington Department of Ecology

7. References

Cramer Fish Sciences, 2010. Appendix 10. Effect of Surface Water Withdrawals on Listed Fish. Mid-Columbia Coho Restoration Program Environmental Impact Statement. BPA.

GeoEngineers, 2010. Appendix 11. Groundwater Withdrawal Impact Report. Mid-Columbia Coho Restoration Program Environmental Impact Statement. BPA.

Hartwig, Eric A. (ECY)

From: Greg Ferguson [ghf@centurytel.net]
Sent: Saturday, June 25, 2011 11:10 AM
To: Hartwig, Eric A. (ECY)
Cc: Tom Scribner; Cory Kamphaus ext 102
Subject: Re: Water rights applications - George
Attachments: George GW Impacts Analysis Letter Report.pdf

Eric,
Attached is the withdrawal analysis for the George applications:
G4-33019, 5/31/11
G4-33006A, 10/29/10
Please attach this analysis to these applications.
Thanks
>
> On Jun 24, 2011, at 4:25 PM, Hartwig, Eric A. (ECY) wrote:
>
>> Greg
>> You can send them to me and I will get them into the Files.
>>
>>
>> Department of Ecology
>> Attn: Eric Hartwig
>> 15 W Yakima Ave. Ste 200
>> Yakima, WA 98902
>>
>> Eric A Hartwig
>> Department of Ecology
>> Water Resources Program
>> CRO
>> 509-454-7297
>> -----Original Message-----
>> From: Greg Ferguson [mailto:ghf@centurytel.net]
>> Sent: Friday, June 24, 2011 3:40 PM
>> To: Hartwig, Eric A. (ECY)
>> Subject: Water rights applications
>>
>> Eric,
>> We have completed groundwater impact analyses for temporary and
>> permanent H2O applications (G4-33005A, G4-33011A, G4-33019, and
>> G4-33006A from the Yakama Nation) at 2 sites. The applications have
>> previously been submitted and we would like to attach these analyses
>> to them. What is the correct process for adding information to
>> applications? Can we do this by email? Who should they be sent to?
>> Cheers
>>
>> _____
>> Greg Ferguson, SSC
>>

Greg Ferguson, SSC

GeoEngineers
1101 South Fawcett Avenue, Suite 200
Tacoma, Washington 98402
253.383.4940

June 17, 2011

Sea Springs Company
46208 Southeast 139th Place
North Bend, Washington 98045

Attention: Greg Ferguson

Subject: Groundwater Withdrawal Impact Analysis
George Site
Mid-Columbia Coho Restoration Project
Yakama Nations Fisheries Groundwater Applications G4-33006 and G4-33019
File No. 9301-006-03

The following letter provides a preliminary evaluation of the potential impacts of groundwater withdrawal related to the groundwater right application that Yakama Nation Fisheries (YNF) has submitted for the George Site as part of their Mid-Columbia Coho Restoration Project. The George Site is located on the south (right) bank of the Wenatchee River approximately 1.5 miles downstream of Lake Wenatchee in Sections 26 and 27 of Township 27 North, Range 17 East. YNF proposes to construct a fish hatchery at the site and is requesting a permit for a groundwater supply of 1,500 gallons per minute (gpm).

INTRODUCTION

YNF drilled Test Well 1 in January 2011 on the George Site to explore for potential groundwater sources. The well is located approximately 250 feet south of the Wenatchee River. Figure 1 shows the George Site and known well locations. A second test well is proposed, but has not been drilled. Test Well 2 is to be located approximately 900 feet south of Test Well 1 (Figure 1). Permanent and temporary groundwater applications have been submitted as part of the project. The permanent application was assigned a control number G4-33006 and a priority date of October 27, 2010; the temporary application has a control number of G4-33019 and priority date of March 2, 2011. YNF proposes to use the groundwater supply at variable withdrawal rates. Lower groundwater production rates of 150 to 200 gpm are expected in the winter months and peak production rates of up to 1,500 are expected in the fall months.

The intent of this analysis is to evaluate the potential impacts resulting from groundwater withdrawal of 1,500 gpm from two wells at the George Site. In absence of testing results, we will use a general range of hydraulic conductivity based on the sieve analysis of aquifer materials.

SOURCE AQUIFER

The source aquifer for the George Site is an unconsolidated sand and gravel overlying bedrock within the Wenatchee River valley. The north and south boundaries of the aquifer are assumed to be the bedrock uplands that rise steeply from the valley floor. The well log data for the area indicate that the wells in the area that are completed in the unconsolidated materials are generally 100 to 200 feet deep, with available drawdown of 75 feet or more. Most wells in the vicinity are for single-family domestic supplies. A few wells located near Lake Wenatchee are operated by Washington State Parks. The nearest off-site residence is assumed to be served by an individual well, although no well log has been correlated with the property nor has a wellhead been observed. The assumed location of the domestic well is shown on Figure 1.

Test Well 1 was drilled to 216.5 feet below ground surface (bgs). The groundwater level was measured at approximately 6 feet bgs during the drilling process. The Water Well Report (well log) is presented as Figure 2. No well screen has been installed and no pumping tests have been conducted on the well as of this date.

Soil samples were collected as the test well was advanced. The proposed source aquifer for the George Site was encountered from 190 to 214 feet in Test Well 1. The sieve analyses indicate that the aquifer formation generally coarsens with depth. During the air-rotary drilling of the source aquifer, water was removed from the open-bottom well casing at estimated rates between 150 and 225 gpm. The preliminary well design anticipates setting a screen from 194 to 214 feet in the unconsolidated sand and gravel overlying the bedrock.

GROUNDWATER WITHDRAWAL IMPACTS ANALYSIS

Hydrogeologic analytical methods were used to estimate the groundwater withdrawal impacts using assumed aquifer characteristics and bedrock boundary effects. The analysis was conducted using the assumptions listed below:

- Two production wells are pumped continuously for 30 days at the peak demand rate of 750 gpm each.
- The source aquifer is confined, based on the thickness of the overlying fine-grained formation, its depth relative to the river, and limited time-of-drilling water level measurements.
- Aquifer thickness is 98 feet, encountered from 116 to 214 feet bgs.
- Aquifer transmissivity is 100,000 gallons per day (gpd)/ft, based on a standard range of hydraulic conductivity values for sand and gravel (Freeze and Cherry, 1979[1]).
- The aquifer storage coefficient is 0.001.

[1] Freeze, R.A. and Cherry, J.A., 1979, Groundwater, Prentice-Hall, Inc., Englewood Cliffs, New Jersey 07632

- There are bedrock boundaries located approximately 1,400 feet north and west and approximately 3,700 feet south of the pumping wells. These negative hydraulic boundaries are simulated using image wells pumping at the same rate as the production wells.
- A leakage factor is used to simulate leakage through the 103-foot-thick, low-permeability confining unit overlying the aquifer.
- The nearest off-site well, although not field located, is assumed to be located at the nearest residence, approximately 1,000 feet northwest of Test Well 1. No well log was found in Ecology's database for a well at this location.

RESULTS

The results of the preliminary hydrogeologic analysis are as follows:

- Drawdown in the pumping wells stabilizes at approximately 20 feet after approximately 3 days of continuous pumping at a combined rate of 1,500 gpm.
- Interference drawdown at the nearest off-site well (assumed to be located 1,000 feet northwest of Test Well 1) is approximately 5 feet.
- Wells located greater than 1 mile from the two George Site wells would experience less than 1 foot of drawdown.
- The negative boundary effects of the bedrock are significant, causing approximately 1.5 feet of additional drawdown in each pumping well.

CONCLUSIONS

Based on the preliminary analysis of the potential impacts of groundwater withdrawal at a maximum rate of 1,500 gpm, the following conclusions were made:

- The 5 feet of drawdown interference predicted in the nearest off-site well would not impair use of the well based on the typical available drawdown of 75 feet or more.
- The drawdown cone would stabilize after 3 days when recharge and/or leakage equal the production rate of 1,500 gpm. The source of the leakage is groundwater in storage within the overlying confining unit and ultimately from the Wenatchee River.
- The aquifer drawdown effects will be seasonal because of the variable usage rates proposed.
- The potential surface water impacts from groundwater withdrawal will be completely offset because the groundwater will be returned to the river. As a result, the groundwater withdrawal will be water-budget neutral with respect to instream flows.

RECOMMENDATIONS

We recommend completing Test Well 1 with a well screen and conducting short-term and long-term pumping tests on the well. If Test Well 2 is drilled, both wells should be completed and available for monitoring of the pumping tests. Other wells in the area, if available and accessible, also should be monitored during the tests to further evaluate potential drawdown interference impacts.

Sincerely,
GeoEngineers, Inc.

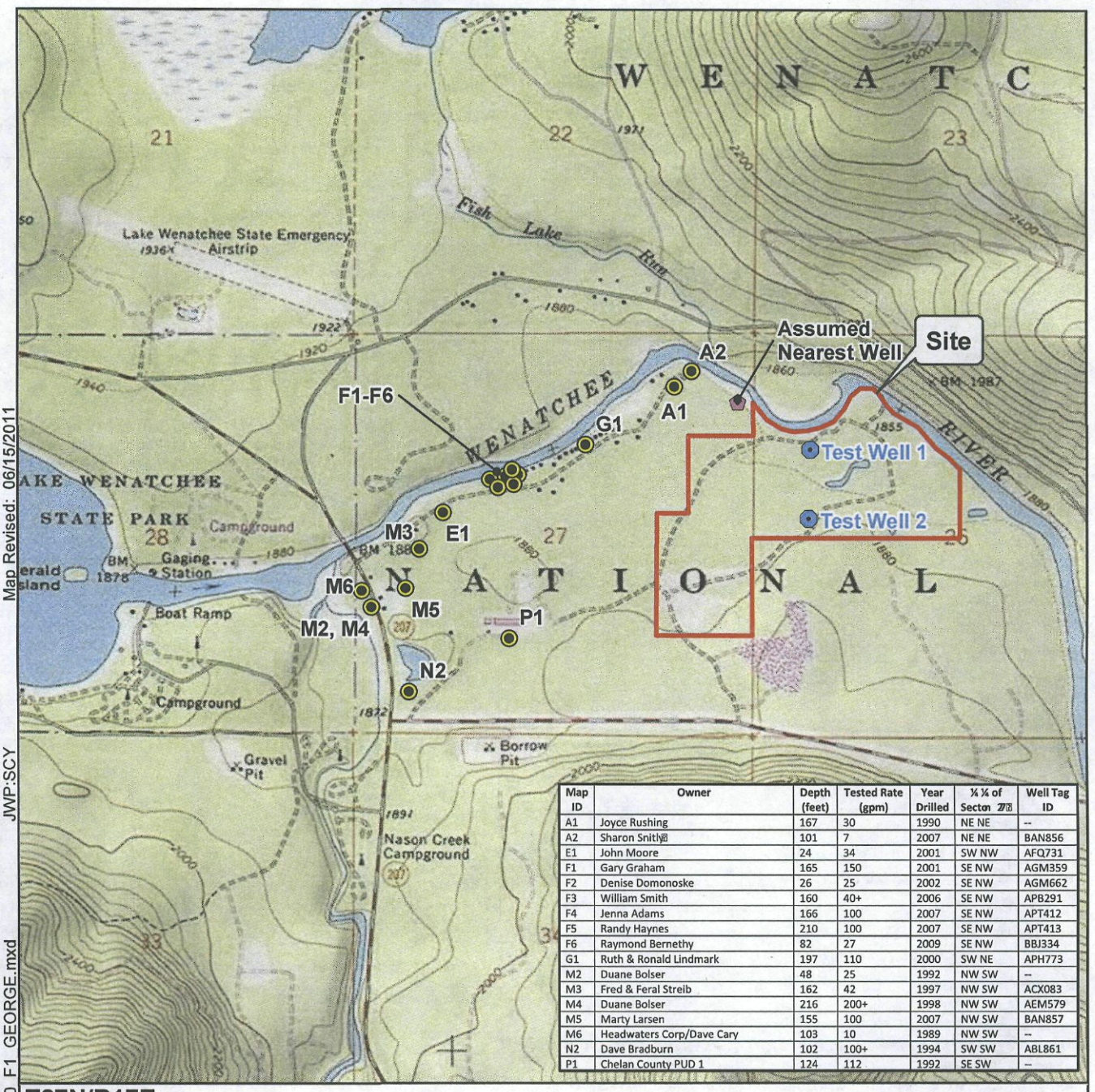
Joel W. Purdy, LG, LHG
Senior Hydrogeologist

State of Washington
Hydrogeologist
588
Licensed Geologist
JOEL W. PURDY

James A. Miller, PE, LG, LHG
Principal Geological Engineer

JWP:JAM:lc

Attachments:
Figure 1. Well Location Map
Water Well Report



Map ID	Owner	Depth (feet)	Tested Rate (gpm)	Year Drilled	¼ ¼ of Section 27	Well Tag ID
A1	Joyce Rushing	167	30	1990	NE NE	--
A2	Sharon Snitily	101	7	2007	NE NE	BAN856
E1	John Moore	24	34	2001	SW NW	AFQ731
F1	Gary Graham	165	150	2001	SE NW	AGM359
F2	Denise Domonoske	26	25	2002	SE NW	AGM662
F3	William Smith	160	40+	2006	SE NW	APB291
F4	Jenna Adams	166	100	2007	SE NW	APT412
F5	Randy Haynes	210	100	2007	SE NW	APT413
F6	Raymond Bernethy	82	27	2009	SE NW	BBJ334
G1	Ruth & Ronald Lindmark	197	110	2000	SW NE	APH773
M2	Duane Bolser	48	25	1992	NW SW	--
M3	Fred & Feral Streib	162	42	1997	NW SW	ACX083
M4	Duane Bolser	216	200+	1998	NW SW	AEM579
M5	Marty Larsen	155	100	2007	NW SW	BAN857
M6	Headwaters Corp/Dave Cary	103	10	1989	NW SW	--
N2	Dave Bradburn	102	100+	1994	SW SW	ABL861
P1	Chelan County PUD 1	124	112	1992	SE SW	--

T27N/R17E

A1 **Approximate Ecology Database Well Location and Map ID (See Table)**

George Site Test Wells

Assumed Nearest Well (No Log)

2,000 0 2,000

Feet

N W E S

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
3. It is unlawful to copy or reproduce all or any part thereof, whether for personal use or resale, without permission.

Data Sources: Topographic map from ESRI (http://goto.arcgisonline.com/maps/USA_Topo_Maps)

NAD 1983 HARN State Plane South, Feet
North arrow oriented to grid north

Well Location Map

George Site
Chelan County, Washington

GeoEngineers

Figure 1

Map Revised: 06/15/2011
JWP:SCY
Path: P:\19\301006\GIS\930100603 T100 F1 GEORGE.mxd
Office: TAC

WATER WELL REPORT

Original & 1st copy – Ecology, 2nd copy – owner, 3rd copy – driller

DEPARTMENT OF ECOLOGY State of Washington

Construction/Decommission *("x" in circle)*

☒ Construction

☐ Decommission *ORIGINAL INSTALLATION*

Notice of Intent Number _____

PROPOSED USE: ☐ Domestic ☐ Industrial ☐ Municipal ☐ DeWater ☐ Irrigation ☒ Test Well ☐ Other Fisheries

TYPE OF WORK: Owner's number of well (if more than one) _____

☒ New well ☐ Reconditioned *Method:* ☐ Dug ☐ Bored ☐ Driven ☐ Deepened ☐ Cable ☒ Rotary ☐ Jetted

DIMENSIONS: Diameter of well 8 inches, drilled 216.5 ft. Depth of completed well 216 ft.

CONSTRUCTION DETAILS

Casing Installed: ☒ Welded 8" Diam. from +2 ft. to 214 ft.
☐ Liner installed _____" Diam. from _____ ft. to _____ ft.
☐ Threaded _____" Diam. From _____ ft. to _____ ft.

Perforations: ☐ Yes ☒ No

Type of perforator used _____

SIZE of perfs _____ in. by _____ in. and no. of perfs _____ from _____ ft. to _____ ft.

Screens: ☐ Yes ☒ No ☐ K-Pac Location _____

Manufacturer's Name _____

Type _____ Model No. _____

Diam. _____ Slot size _____ from _____ ft. to _____ ft.

Diam. _____ Slot size _____ from _____ ft. to _____ ft.

Gravel/Filter packed: ☐ Yes ☒ No Size of gravel/sand _____

Materials placed from _____ ft. to _____ ft.

Surface Seal: ☒ Yes ☐ No To what depth? 18 ft.

Material used in seal Bentonite

Did any strata contain unusable water? ☐ Yes ☒ No

Type of water? _____ Depth of strata _____

Method of sealing strata off _____

PUMP: Manufacturer's Name _____

Type: _____ H.P. _____

WATER LEVELS: Land-surface elevation above mean sea level 1849 ft.

Static level 8 ft. below top of well Date 01-14-11

Artesian pressure _____ lbs. per square inch Date _____

Artesian water is controlled by _____ (cap, valve, etc.)

WELL TESTS: Drawdown is amount water level is lowered below static level

Was a pump test made? ☐ Yes ☒ No If yes, by whom? _____

Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.

Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.

Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test _____

Bailer test _____ gal./min. with _____ ft. drawdown after _____ hrs.

Airtest 0 gal./min. with stem set at 215 ft. for _____ hrs.

Artesian flow _____ g.p.m. Date 01-14-11

Temperature of water _____ Was a chemical analysis made? ☐ Yes ☒ No

CURRENT

Notice of Intent No. W 272267 EXEMPT

Unique Ecology Well ID Tag No. BBJ 128

Water Right Permit No. _____

Property Owner Name Yakima Nation / Seaspring Co.

Well Street Address Off Beaver Valley Rd.

City Leavenworth County Chelan

Location NE 1/4-1/4 NW 1/4 Sec 26 Twn 27 R 17 EWM ☒ Or WWM ☐
(s, t, r Still REQUIRED)

Lat/Long Lat Deg N 47 Lat Min/Sec 48.786
Long Deg W 120 Long Min/Sec 41.424

Tax Parcel No. (Required) 271726 2001 00

CONSTRUCTION OR DECOMMISSION PROCEDURE

Formation: Describe by color, character, size of material and structure, and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information. (USE ADDITIONAL SHEETS IF NECESSARY.)

MATERIAL	FROM	TO
Brown sand. roots	0	4
Brown sand, gravels WB	4	13
Gray thick silt, fine sand	13	64
Gray silty clay	64	82
Heaving gray fine sand, silt	82	112
Gray thick silt	112	116
Heaving gray fine sand	116	129
Heaving gray fine sand,		
2% gravels	129	133
Heaving gray fine sand	133	162
Heaving gray fine sand,		
4% gravels	162	166
Gray thick fine sand, silt	166	173
Gray fine sand, gravel	173	182
Gray fine sand, silt	182	190
Gray fine sand, gravel WB	190	199
Gravels, gray sand 200+ gpm	199	210
Cobbles	210	214
Gray sandstone	214	216 1/2
To be screened on later date.		

Start Date 01-12-11 Completed Date 01-14-11

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

☒ Driller ☐ Engineer ☐ Trainee Name (Print) Brett Phythian

Driller/Engineer/Trainee Signature Brett

Driller or trainee License No. 1249

IF TRAINEE: Driller's License No:

Driller's Signature:

Drilling Company Tumwater Drilling & Pump Inc.

Address P.O.Box 777 / 9290 Hwy 2

City, State, Zip Leavenworth , WA, 98826

Contractor's Registration No. TUMWADIP011LZ Date 01-17-2011

Hartwig, Eric A. (ECY)

From: Hartwig, Eric A. (ECY)
Sent: Wednesday, March 30, 2011 11:18 AM
To: 'Cory Kamphaus'
Subject: RE: water right applications and additional fees

Cory sorry for not getting you this sooner.
The applications that were filed for the Gilcreek Rd project need some more information and fees. The temporary applications are ok but the permanent application needs to be divided into a ground water and surface water. As we talked about I will amend the permanent application to reflect a surface water diversion of 3300 gpm (7.35 csf). The fee for this would be $735.00 of which you sent in $50.00. So you need to send in $685.00. Also you need to submit an application for the ground water at 1600 gpm. The fee for this would be $355.56. I will hold these files until I receive the files.

We also discussed that you may want to pursue the cost reimbursement program for these applications. If you decide to pursue this method of processing then you would not need to send in any additional fees but a letter directing me to put them into that processing line.

If you have any questions please call me.

Eric

Eric A Hartwig
Department of Ecology
Water Resources Program
CRO
509-454-7297

From: Cory Kamphaus [mailto:cory@mid-columbia-coho.net]
Sent: Wednesday, March 30, 2011 10:06 AM
To: Hartwig, Eric A. (ECY)
Cc: 'Greg Ferguson'
Subject: water right applications and additional fees
Importance: High

Eric-

I never heard back from you on Friday regarding our phone conversation about the water right applications for the Dryden Pit Site as well as the additional fees associated with the edits. If you could e-mail myself and Greg Ferguson as soon as possible, that would be much appreciated. Thank you.

Cory Kamphaus
Fisheries Biologist
YN-Mid-Columbia Coho Program
p- 509.548.9413
c- 509.860.1694
f- 509.548.2118

Split App. into SW/GW

and corrections to all info including Sources, QA/QA, etc.?

NOT NEEDED GOING WITH COST REIMBURSEMENT

Eric contacting Applicant?

* Additional Fees

Permanent

gpm, re-calculate

cfs = $357 - $50 = 307 Surf. Wtr

ADDITIONAL FEES

Total Fee Required $ 733.33

-50

Additional Fee Amt. $ 683.33

(CIRCLE LETTER TO BE MAILED)

App-nofee (return appl) _____
App-addfee (process appl) _____
App-$10fee-addfee (ret. appl) _____
Extension-addfee _____
Assignment-addfee _____

Make file copy of letter & the request for Expando folder _____

3300 gpm?

RECEIPT

Department of Ecology (4610)
PO Box 47611
Olympia, WA 98504-7611
(360) 407-7095

Receipt Number **11CJ014486**
Manual Receipt

Document Number **461J2693 CJ** Date **03/01/2011** FM **21**

Remitter Name SEA SPRINGS Receipt Name

Check/Draw Number **845**

Document Amount **150.00**

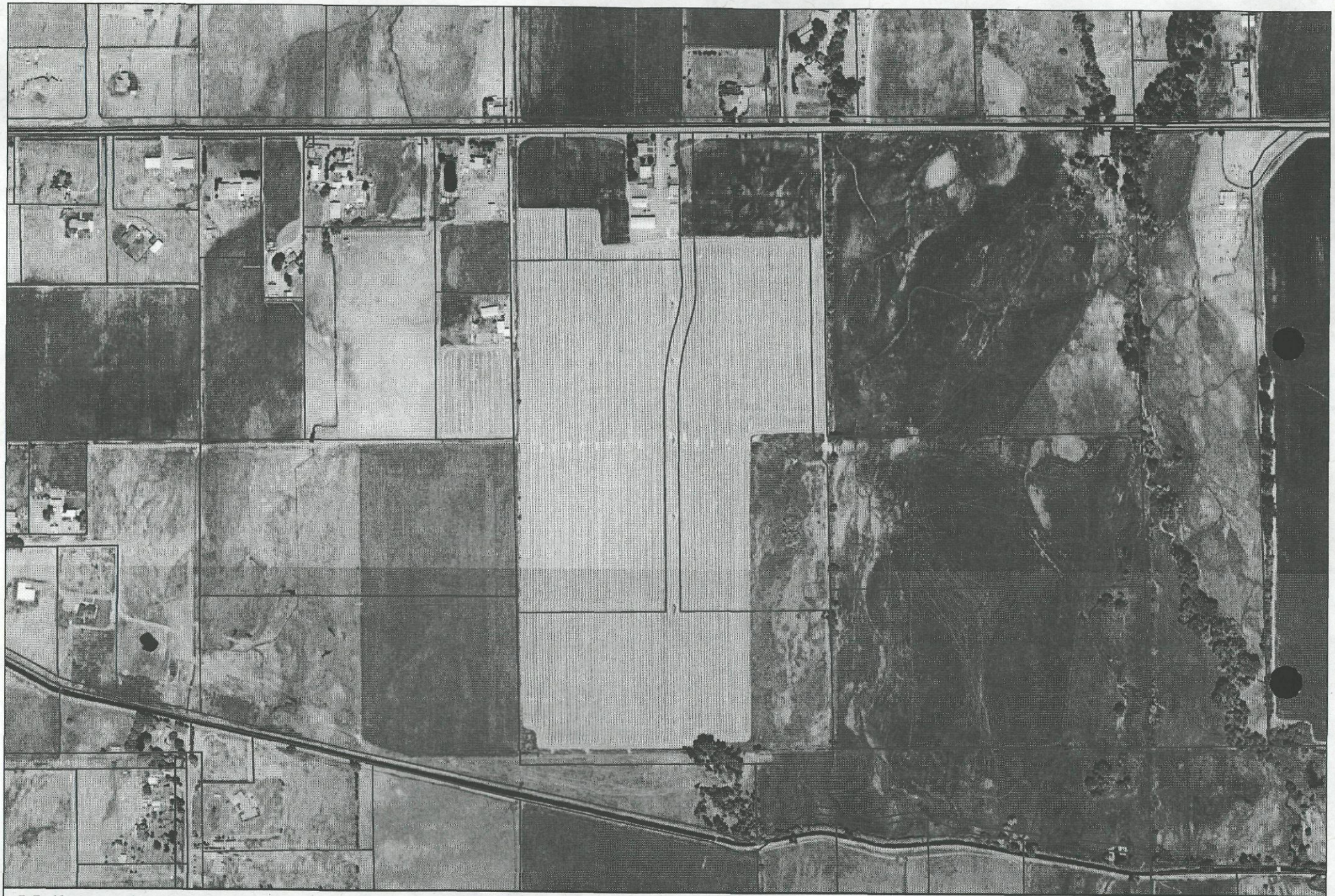
Method of Payment **Check**

Comment Description **WATER RIGHTS - CRO**

REF DOC NR	REF DOC SFX	INV NR	ID NR	SUB ID NR	T C	R	FUND	MAJ GRP	MAG SRC	SUB SRC	CNTY	WORK CLS	PIC	AI	ORG	PRJ	SUB PRJ	PRJ PHS	SUB OBJ	SUB SUB OBJ	VAR GL	SUB SID DR	SUB SID CR	ALLOC AMT
					001		001	02	85	000011														150.00

Paid $150.00 FOR 3 Applications each. EJ

RECEIVED
MAR 0 2 2011
DEPARTMENT OF ECOLOGY - CENTRAL REGIONAL OFFICE



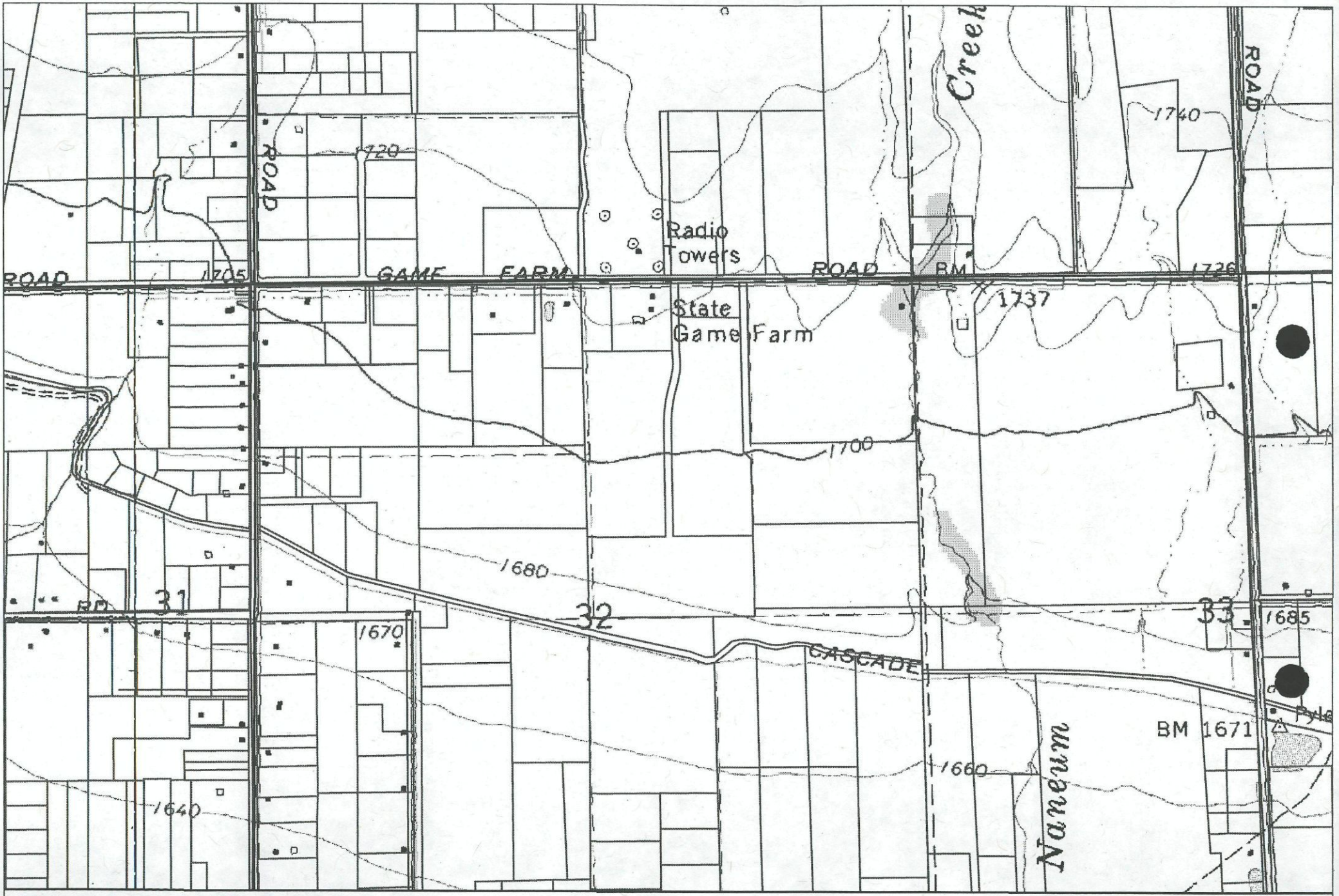
Mellegaard

263 0 263 526 Feet

1:6322

N

Map printed 8/04/2006



Mellegaard Game Farm property

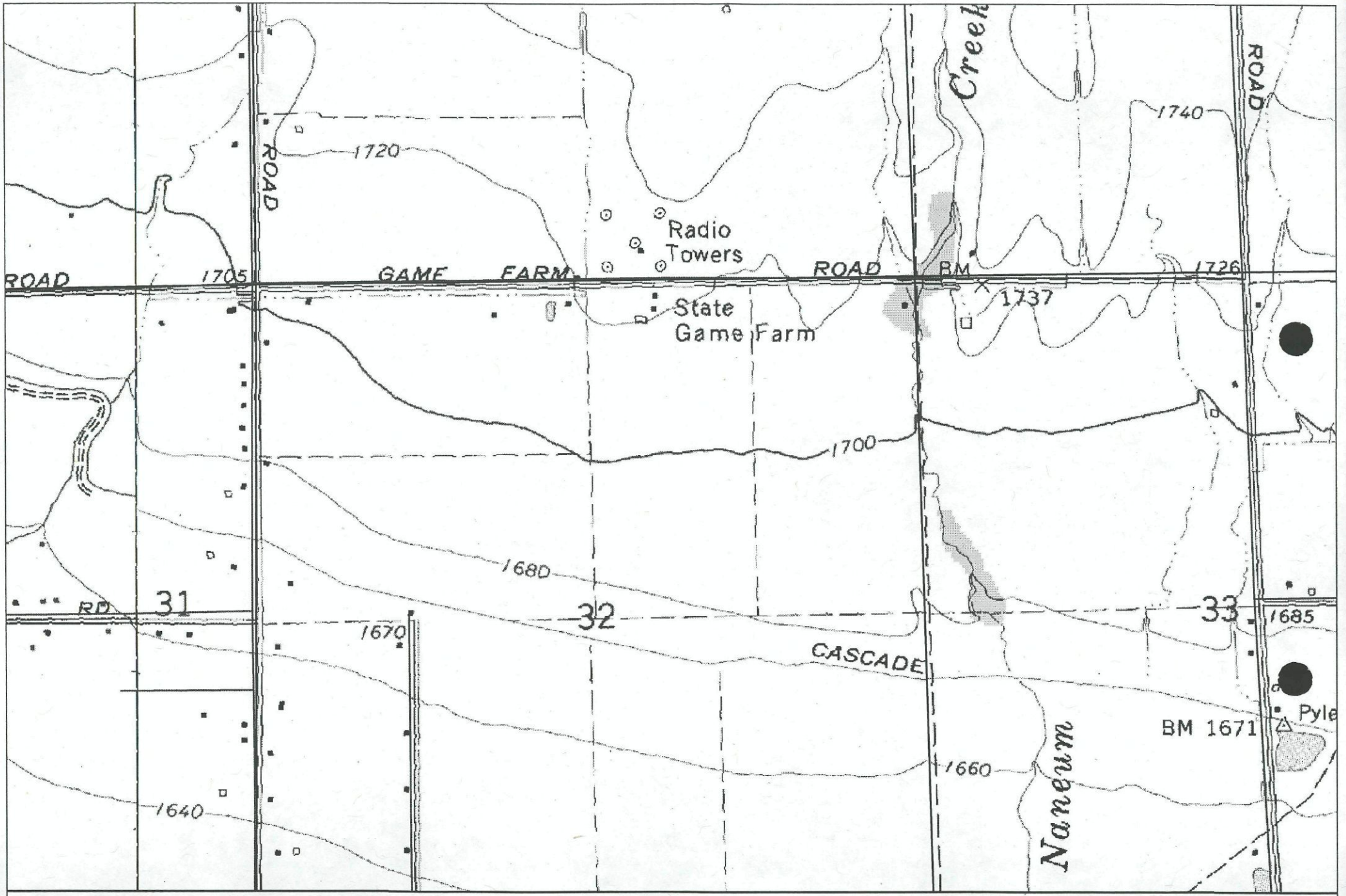
topographic w/ parcel overlay

500 0 500 1000 Feet

1:12000

N

Map printed 8/11/2006



Mellegaard Game Farm property

topographic

500 0 500 1000 Feet

1:12000

N

Map printed 8/11/2006

Mellegaard Game Farm property

2005 vintage photo

260 0 260 520 Feet

1:6246

N

Map printed 8/11/2006

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DEPARTMENT OF ECOLOGY
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PO BOX 47611
OLYMPIA, WA 98504-7611

RETURN RECEIPT REQUESTED